

Speech therapy in temporomandibular joint (TMJ) dysfunction: a literature review

Terapia fonoaudiológica nas disfunções temporomandibulares (DTM): uma revisão de literatura

Terapia fonoaudiológica en trastornos temporomandibulares (TTM): una revisión de la literatura

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Abstract

Introduction: Temporomandibular joint (TMJ) dysfunction is recognized as a group of altered musculoskeletal and neuromuscular conditions that encompass temporomandibular joints (TMJ), masticatory muscles and all associated tissues, with multiple etiologies and specific treatments. **Objective:** The objective of this paper is to review the literature on the therapeutic proposals of temporomandibular joint (TMJ) dysfunctions and to verify what therapeutic procedures are used in speech therapy. **Methods:** Articles were included that added to their objectives the description of proposals for speech therapy intervention, published in Portuguese and English, with the abstracts available in the LILACS, PUBMED and SCIELO databases and published between 2008 and 2018. The descriptors used were: “síndrome da disfunção da articulação temporomandibular”, “tratamento”, “fonoaudiologia”, “trastornos da articulação temporomandibular”, “temporomandibular joint dysfunction syndrome”, “treatment”, “speech therapy”. **Results:** Of the 83 selected articles, 10 were considered for study analysis because they met the inclusion criteria. Of these, 3 were without available access and 2 were repeated, thus remaining 5 articles for analysis. Articles were found that addressed techniques with low-intensity laser, traditional orofacial myofunctional therapy, and therapeutic bandage. **Conclusion:** It is concluded that in studies in the field

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Author's contributions:

CNB: study conception, methodology, data collection, article outline.

CCC and GRC: critical review.

VCG: methodology, critical review, orientation.

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of speech therapy, treatments bring, in addition to the reduction of pain, the need for rehabilitation of orofacial functions. Studies are still scarce within this pathology, and new research on TMJ dysfunction is very important because speech therapy can bring a beneficial variation of treatments, aiming at the restoration of stomatognathic functions.

Keywords: Temporomandibular Joint Dysfunction Syndrome; Temporomandibular Joint Disorders; Treatment, Speech Therapy.

Resumo

Introdução: A Disfunção Temporomandibular (DTM) é reconhecida como um grupo de condições musculoesqueléticas e neuromusculares alteradas que abrangem as articulações temporomandibulares (ATMs), os músculos mastigatórios e todos os tecidos associados, com etiologias múltiplas e tratamentos específicos.

Objetivo: O objetivo deste trabalho é revisar a literatura sobre as propostas terapêuticas das disfunções temporomandibulares (DTM's) e verificar quais são os procedimentos terapêuticos utilizados na terapia fonoaudiológica. **Métodos:** Foram incluídos artigos que agregaram aos seus objetivos a descrição de propostas de intervenção fonoaudiológica, publicados em português e inglês, com os resumos disponíveis nas bases de dados LILACS, PUBMED e SCIELO e publicados entre 2008 e 2018. Os descritores utilizados foram: "síndrome da disfunção da articulação temporomandibular", "tratamento", "fonoaudiologia", "transtornos da articulação temporomandibular", "temporomandibular joint dysfunction syndrome", "treatment", "speech therapy". **Resultados:** Dos 83 artigos selecionados, 10 foram considerados para análise do estudo por atenderem aos critérios de inclusão. Destes, 3 se encontravam sem acesso disponível e 2 estavam repetidos, restando, assim 5 artigos para a análise. Foram encontrados artigos que abordaram técnicas com laser de baixa intensidade, terapia miofuncional orofacial tradicional e bandagem terapêutica. **Conclusão:** Conclui-se que nos estudos na área da Fonoaudiologia, os tratamentos trazem, além da diminuição da dor, a necessidade da reabilitação das funções orofaciais. Os estudos ainda são escassos dentro dessa patologia, sendo de muita importância novas pesquisas sobre a DTM, pois a fonoaudiologia pode trazer uma variação benéfica de tratamentos, visando o restabelecimento das funções estomatognáticas.

Palavras-chave: Síndrome da Disfunção da Articulação Temporomandibular; Transtornos da Articulação Temporomandibular; Tratamento; Fonoaudiologia.

Resumen

Introducción: El Trastorno Temporomandibular (TTM) se reconoce como un grupo de afecciones musculoesqueléticas y neuromusculares alteradas que abarcan las articulaciones temporomandibulares (ATM), los músculos masticatorios y todos los tejidos asociados, con múltiples etiologías y tratamientos específicos. **Objetivo:** El objetivo de este trabajo es revisar la literatura sobre las propuestas terapéuticas de los trastornos temporomandibulares (TTM) y verificar los procedimientos terapéuticos utilizados en la terapia fonoaudiológica. **Métodos:** Se incluyeron artículos que añadieron a sus objetivos la descripción de las propuestas de intervención fonoaudiológica, publicadas en portugués e inglés, con los resúmenes disponibles en las bases de datos LILACS, PUBMED y SCIELO y publicadas entre 2008 y 2018. Los descriptores utilizados fueron: "síndrome da disfunção da articulação temporomandibular", "tratamento", "fonoaudiologia", "transtornos da articulação temporomandibular", "temporomandibular joint dysfunction syndrome", "treatment", "speech therapy". **Resultados:** De los 83 artículos seleccionados, 10 fueron considerados para el análisis del estudio porque cumplían los criterios de inclusión. De ellos, 3 no tenían acceso disponible y 2 se repitieron, dejando 5 artículos para el análisis. Se encontraron artículos que abordaban técnicas con láser de baja intensidad, terapia miofuncional orofacial tradicional y vendaje terapéutico. **Conclusión:** se concluye que en los estudios en el campo de la Fonoaudiología, los tratamientos traen, además de la reducción del dolor, la necesidad de rehabilitación de las funciones orofaciales. Los estudios son todavía escasos dentro de esta patología, y nuevas investigaciones sobre TTM son muy importantes, porque la terapia fonoaudiológica puede traer una variación beneficiosa de los tratamientos, con el objetivo de restaurar las funciones estomatognáticas.

Palabras clave: Síndrome de Disfunción de la Articulación Temporomandibular; Trastornos de la Articulación Temporomandibular; Tratamiento; Fonoaudiología.

Introduction

Temporomandibular joint (TMJ) dysfunction is recognized as a group of altered musculoskeletal and neuromuscular conditions that encompass temporomandibular joints (TMJs), masticatory muscles and all associated tissues¹⁻²; epidemiological studies indicate that TMJ is an alteration that compromises public health, affecting 5 to 12% of the population³. Some studies also show that about 40% to 75% of the population has at least one sign of TMJ dysfunction⁴.

The etiology of TMJ dysfunction is multifactorial⁵ and is associated with predisposing factors, such as occlusal alterations, parafunctional habits, stress, emotional tension, anxiety, and irregularities in the intra-articular disc, appearing in different populations. These factors may be involved in episodes of joint inflammation, muscle damage, and pain or spasms⁶. Bearing in mind that the greater the number of factors involved, the greater the chance of triggering pain and dysfunction⁷.

Literature has shown that, regarding the classification between genders, TMJ dysfunction occurs more in women than in men⁸⁻⁹. Studies mention that this data occurs as a result of women exhibiting greater demand for treatments than men, and also due to a higher level of estrogen, to the menstrual cycle² and even greater anxiety in this gender⁵. As for the dominant symptoms, they are related to pain in the cervical region, shoulders, facial muscles, headache, dental, and TMJs wear². The clinical picture indicative of TMJ commonly includes signs and symptoms such as joint noises, facial pain, otalgia, muscle fatigue, functional limitations, and deviation of the direction of the jaw during movement and, generating discomfort and detriment to the quality of life¹⁰⁻¹¹.

The treatment of TMJ dysfunctions needs to be carried out by a multidisciplinary team, composed of dentists, psychologists, physiotherapists, and speech therapists. This therapy should always aim at restoring impaired functions, relieving pain, reducing muscle overload, promoting neuromuscular and occlusal balance, and reducing anxiety and stress¹²⁻¹³.

The existing therapies for TMJ dysfunctions are diverse and clinical diagnosis by a specialist is indispensable for the most appropriate to be applied. In conservative treatment, psychological interventions, physiotherapy, pharmacological

therapy, occlusion plaques, muscle exercises, and manual therapies and guidelines can be followed¹⁴⁻¹⁵.

It has been proposed, as part of treatment for patients with TMJ dysfunction, the orofacial myofunctional speech therapy, which will minimize factors related to the functional conditions of the stomatognathic system and proposes exercises with the aim of increasing the precision and coordination of movements¹⁶⁻¹⁷. The rehabilitation and prevention of TMJ dysfunction also include strategies that bring about the adequacy of the range of mandibular movements and pain reduction, as these issues are essential for the functional recovery of the orofacial myofunctional system¹⁸.

There are few studies in the speech-language pathology literature that report on the treatments of temporomandibular dysfunctions, but recently some research has brought about new treatment methods that help in the rehabilitation of the TMJ dysfunction. However, there are still few studies that discuss and correlate new treatment methods and techniques demonstrating their effectiveness. Thus, the study can contribute to speech therapy, since it can benefit from these new techniques and improve conventional therapy. The objective of this study is to review the literature on the therapeutic proposals for temporomandibular joint (TMJ) dysfunctions and to verify which are the therapeutic procedures used in speech therapy.

Method

This is a bibliographic review study, using the electronic databases LILACS, PUBMED, and SCIELO, which answers the following question: “What are the therapeutic procedures used to treat the temporomandibular joint dysfunctions in the speech therapy clinic?”

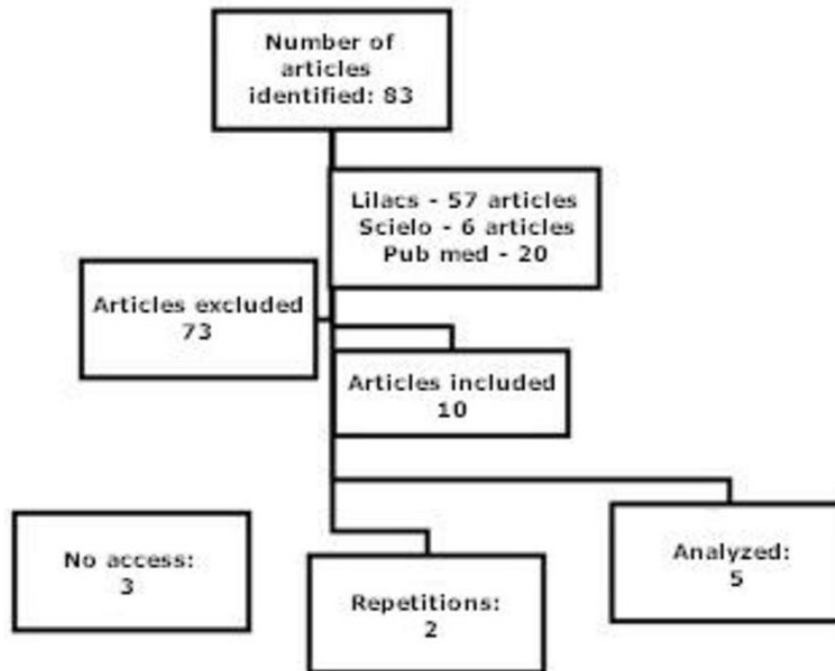
When starting the search, the term “temporomandibular joint dysfunction” was found in publications in several areas, such as physiotherapy, dentistry, and speech therapy. The descriptors used were: “síndrome da disfunção da articulação temporomandibular”, “tratamento”, “fonoaudiologia”, “transtornos da articulação temporomandibular”, “temporomandibular joint dysfunction syndrome”, “treatment”, “speech therapy” and their combinations. The descriptors used belong to the DeCS (Descriptors in Health Sciences) and were used to define the area of interest of the study.

Data collection was carried out from April to June 2019. Articles that added to their objectives the description of speech-language pathology intervention proposals, published in Portuguese and English, with the abstracts available in the selected databases and published between 2008 and 2018. The articles that had been selected in one of the databases were disregarded in the other databases. Articles published in a period prior to the selected years were excluded, which did not allow access to the full text and those that did not describe the objective of the speech-language intervention to their investigation. Subsequently, the results were interpreted.

Results

Of the total of 83 articles, 57 of them were found in the LILACS database, 20 articles in PUBMED and 6 articles in SCIELO. From these, articles that did not comply with the inclusion criteria proposed for this survey were removed.

Of the 83 articles selected, 10 were considered for analysis of the study because they met the inclusion criteria. Of these, 3 were without access and 2 were repeated, thus leaving 5 articles for analysis. For analysis purposes, the articles were divided according to Figure 1.



Source: Author, 2019.

Figure 1. Selection and analysis of articles

Chart 1. Main data of the studies selected for analysis

Author	Title	Study Objective	Techniques used	Results/ Conclusion
Richardson et al., 2012 ⁽¹⁹⁾	<i>The effect of oral motor exercises on patients with myofascial pain of masticatory system. Case series report</i>	To present three case studies of patients who reported myofunctional pain and who received multidisciplinary treatment with an oral motor exercise program.	Three to four sessions of oral motor therapy, aiming to increase mobility of the lips, jaw and tongue, improving strength and range of motion.	Therapy was beneficial, with reduced pain and improved masticatory function.
Melchior et al., 2012 ⁽²⁰⁾	<i>Does low intensity laser therapy reduce pain and change orofacial myofunctional conditions?</i>	Check if the application of low intensity laser helps in the remission of pain, evaluate if there are orofacial myofunctional changes and check if the pain remission is maintained for 30 days after the protocol.	Laser - doses of 60mW for 40 seconds, performed twice a week for four weeks.	The laser therapy provided immediate pain relief, however, it was not effective in the long term. Pain reduction was not sufficient to present orofacial myofunctional changes.
Melchior, et al, 2016 ⁽²¹⁾	<i>Effect of speech therapy after low-intensity laser therapy in patients with TMJ dysfunction: a descriptive study</i>	To analyze the effect of OMT in the treatment of patients with TMJ dysfunction, according to the Research Diagnostic Criteria for temporomandibular disorders (RDC/TMJ), after analgesia with low-intensity laser therapy (LILT), regarding the orofacial myofunctional conditions (OMC) and regarding the perception of TMJ dysfunction symptoms.	Patients were referred for speech therapy evaluation 30 days after finishing the treatment with LILT for presenting orofacial myofunctional changes related to the condition the total number of sessions ranged from 10 to 13, with 1 per week lasting 50 minutes. 2nd stage: myotherapy, consisting of exercises for specific muscle groups, with the purpose of increasing flexibility, coordination and symmetry of movements and stabilizing the function of the TMJ. 3rd stage: BMT itself, for the balance of stomatognathic functions.	The orofacial myofunctional therapy, instituted after analgesia with low-intensity laser therapy, promoted balance of the orofacial functions of the studied sample and decreased of the remaining TMJ dysfunction signs and symptoms, according to the self-perception of the treated individuals.

Author	Title	Study Objective	Techniques used	Results/ Conclusion
Machado et al., 2016 ⁽²²⁾	<i>Effects of oral motor exercises and laser therapy on chronic temporomandibular disorders: a randomized study with follow-up</i>	Investigate the effectiveness of combining low intensity laser with myofunctional therapy, comparing the results with isolated treatments and with a placebo treatment.	Laser - 60mW for 40 seconds, bilateral application in condyle, masseter and temporal region. Myofunctional therapy - instructions and guidance on TMJ dysfunction, strategies to improve pain with thermotherapy, massage and relaxation, myofunctional exercises for the tongue, lips, cheeks and jaw and orofacial myofunctional training. 45-minute sessions, totalizing a maximum of nine sessions, weekly at the beginning and, after 30 days, every two weeks.	The combination of techniques was more effective in the rehabilitation of TMJ dysfunction; however, it was no better than the complete myofunctional therapy protocol (exercises associated with strategies such as relaxation, hot compresses and massage techniques).
Hernandes, et al. 2017 ⁽²³⁾	<i>Speech therapy performance in temporomandibular disorders in two cases: comparative analysis of the effects of traditional therapy and the use of the associated therapeutic bandage</i>	To verify and compare the effects of traditional speech therapy and the associated use of therapeutic bandage in the treatment of temporomandibular muscle disorders in two cases.	The first individual called TT (traditional therapy) was submitted to traditional speech therapy in temporomandibular joint dysfunction. Removal of deleterious habits, thermotherapy, massages, isometric and isotonic exercises in the region of masseteric musculature and cervical musculature relaxation, in addition to the orientations. The second individual called TB (therapy and bandaging), in addition to these same resources, had the use of elastic bandage on the bilateral masseter muscle. With the objective of relaxing this structure, remaining with the same twenty-four hours/day. The bandage was changed three times a week at the end of each session, remaining forty-five consecutive days in total. Twelve therapy sessions were held, with fifty minutes each.	The signs and symptoms present at the beginning of therapy were ceased in both therapies. The TB patient had reduced pain in a reduced number of sessions compared to the other individual. Speech therapy, using traditional techniques and the application of the elastic bandage associated with them, demonstrate therapeutic benefits in subjects with TMJ dysfunction. However, both techniques proved to be effective at the end of the speech therapy.

Source: Author, 2019.

Discussion

In general, after analyzing the studies, it was observed that in most of them, the samples were aged between 18 and 61 years old (adults and the elderly), with a prevalence of females. It should be noted, however, that none of the analyzed articles differentiated between genders, or directed their samples.

Among the treatment techniques used by Speech Therapy, the first article presents case studies with patients who reported myofunctional pain and who received multidisciplinary treatment with an oral motor exercise program¹⁹. The following three studies examined the effect of applying low-level laser, associated or not with orofacial myofunctional therapy (OMT)²⁰⁻²¹⁻²². The fifth and last study used traditional techniques and therapeutic bandaging technique²³.

The work of Richardson et al.¹⁹ aimed to present three case reports of patients with myofascial pain who received treatment at the University of Buffalo School of Dental Medicine. Practices for reducing pain and improving the function of masticatory muscles were addressed through a multidisciplinary treatment. The authors report cases that explore the impacts of oral motor exercises on the management of myofascial pain. These exercises (for the lips, tongue, cheeks and, masticatory muscles) are used by speech therapists to improve strength, range of motion, and coordination of the oral musculature. In general, the study shows that the exercises used improved the coordination of the orofacial muscles, increased blood circulation, and relieving pain. There was also an improvement in the strength and range of mandibular movements, among others.

The research by Melchior et al.²⁰ aimed to verify whether low-intensity laser therapy would promote significant pain remission; assess whether this alters the orofacial myofunctional conditions of the sample, and whether or not pain improvement would remain stable after a 30-day follow-up for pain conditions. The laser was used alone and was applied in direct contact with the patient's skin, on the upper, middle, and lower thirds of the masseter muscle (three points) and anterior region of the temporal muscle (one point), the applications were performed in two sessions per week for four continuous weeks, totaling eight sessions. It suggests that the effects of laser therapy reduce pain

due to the anti-inflammatory and analgesic effect. The authors also indicate that laser therapy relieved pain, but did not affect orofacial myofunctional conditions, also illustrating that the remission of pain achieved by laser therapy was, in itself, unable to change the functioning of the stomatognathic system. Laser therapy promoted a significant remission of pain immediately after treatment, proving to be an effective modality of immediate symptom relief, but it did not demonstrate a long-term effect.

The study by Melchior et al.²¹, aimed to analyze the effect of OMT in the treatment of patients with TMJ dysfunction, after analgesia with low-intensity laser therapy (LILT), regarding the orofacial myofunctional conditions (OMC) and regarding the perception of the symptoms of the TMJ dysfunction. It consisted of three stages that aimed to guide and improve the development of speech therapy, in addition to promoting patient compliance with treatment. It was observed that the signs and symptoms involving the orofacial region, in which pain was predominant, were one of the main reasons for seeking treatment, with relief being the first goal to be established. However, the state of analgesia achieved by the Low-Intensity Laser (LILT) was not durable for all individuals after 30 days, in addition to not having changed the orofacial myofunctional conditions (OMC), which could be acting as continuous TMJ dysfunction factors. Patients in these conditions underwent speech therapy treatment of orofacial myofunctional therapy, which, according to the authors, was necessary after treatment with low-intensity laser (LILT), the remaining analgesia of which favored the institution of orofacial myofunctional exercises.

However, the use of isolated laser was proven beneficial, only for immediate pain relief. The association of laser therapy with myofunctional therapy, on the other hand, was more efficient than the isolated use of laser, the results being similar to those achieved with complete myofunctional therapy. The study also shows that OMT, performed after analgesia with LILT, caused a balance in the orofacial functions of the examined sample and a reduction in the remaining TMJ dysfunction signs and symptoms, given the self-perception of the treated subjects²¹.

The study by Machado et al.²² aimed to investigate the efficacy of the combination of low-intensity laser therapy with oral motor exercises for rehabilitation of patients with (TMJ dysfunction).

The treatment of TMJ dysfunction consisted of one or more modalities, grouped according to the OMT protocol for TMJ dysfunction, consisting of instructions to patients about TMJ dysfunction, myofunctional disorders, and necessary care to avoid overload; strategies for pain relief were also carried out, such as thermotherapy, massage and relaxation training; myofunctional exercises (exercises for the tongue, lips and cheeks, and muscles of the jaw - mobility, resistance, muscular strength) and orofacial function training. The application of a low-intensity laser was done bilaterally and locally with light contact with the skin in five locations in the TMJ region. The main issues pointed out are that all treatments promoted favorable changes, however, pain relief and exercise strategies were more adept at decreasing TMJ dysfunction symptoms, as well as functional orofacial rehabilitation. Therefore, the laser combined with exercises (OM), for the authors, would be more effective in promoting TMJ dysfunction rehabilitation. According to them, the treatment with the isolated laser was no better than the full OMT protocol (OM exercises associated with strategies such as relaxation, hot compress, and massage techniques).

The studies by Melchior et al.²⁰ and Machado et al.²² showed that there was an assessment to monitor the individuals in the long-term. As an evaluation tool, the articles used protocols already published in the literature and widely directed in the area. Orofacial myofunctional therapy showed considerable results for pain relief (on palpation), reduction of otological symptoms, reduction of muscle asymmetry, and evolution in the mandibular mobility and orofacial functions.

Regarding the study by Hernandez, et al.²³, the objective was to verify and compare the effects of traditional speech therapy and the associated use of therapeutic bandaging in the treatment of muscle temporomandibular dysfunctions in two cases. The individual with traditional speech therapy was submitted to thermotherapy, massages, isometric and isotonic exercises in the region of masseteric musculature and cervical musculature relaxation. The second individual, on the other hand, used the same resources in addition to the use of elastic bandage, which was applied to the masseter muscle bilaterally, with a fixed point at the insertion of the muscle and a mobile point at the origin, remaining for twenty-four hours/day. The bandage was changed three times a week at the end of each

session. Therefore, it was possible to verify that the use of the elastic bandage helps to decrease the compression produced in the sensory receptors, due to the ripples that the bandage promotes, elevating the skin and improving the blood and lymphatic circulation. Also according to the authors, although the use of elastic bandages is increasingly widespread among health professionals, most studies still focus on sports and physiotherapy.

This study shows that the therapeutic bandage associated with traditional speech therapy, causes a decrease in pain in a reduced number of sessions compared to traditional therapy alone, due to the neurosensitive maintenance of the stimulus for a long period of time, which exceeds the moments of therapy in a clinical setting. Thus, the two therapies had similar results, since the subjects showed improvement in relation to the mandibular functional movements and a significant reduction in the symptoms initially presented. However, it could be concluded that the subject who had myofunctional therapy associated with the use of bandages had reduced pain in a reduced number of sessions compared to those who received only traditional therapy²³.

Among the disorders included in the studies, myofascial pain was the most frequent manifestation, that is, muscle disorder is the most evident sign in TMJ dysfunctions, accompanied by degenerative inflammatory disorders of articular disc displacement. Regarding the results achieved by therapies, most of them prioritized the reduction of pain and the improvement of mandibular mobility. The studies analyzed mainly changes related to orofacial functions and the importance of performing the rehabilitation of orofacial functions and orofacial myofunctional balance.

In the study by Richardson et al.¹⁹, it was evidenced that the improvement observed in these patients could be explained by many factors, such as the history of the pain condition, a placebo effect, or the result of a therapeutic effect of the other predicted modalities, without the improvement being fully linked with the exercises. Melchior et al.²⁰ demonstrated that laser therapy performed before orofacial myofunctional therapy, can facilitate the therapeutic process and promote pain reduction, allowing better execution of exercises and thus reducing therapy time. However, the limits of the study did not allow a reliable response to this hypothesis, which points to a gap in the work. In

Melchior et al.²¹ research, the limitation occurs due to the scarce number of patients (five) and implies the difficulty of generalizing the results to other populations with TMJ dysfunction.

A potential limitation of Machado's study et al.²² was the heterogeneity of the sample with several TMJ dysfunction classifications, which could have effects on the treatment results. In the study by Hernandez et al.²³, the weak point is its methodological design, which needed to be more rigid, with a larger sample and application of quantitative indicators to verify the effectiveness of the application of elastic bandages in TMJ dysfunctions. Thus, the articles analyzed showed that the topic still needs to be further studied.

Conclusion

It was possible to observe in the studies, that there is a variety of treatments, each providing a certain type of benefit. Despite this, treatments that combine several techniques, such as laser therapy or the use of therapeutic bandages associated with therapy with orofacial myofunctional exercises demonstrate better effects than isolated treatments. The isolated laser did not provide better results than the complete myofunctional treatment. Thus, it was also possible to observe that the combination of therapies enhances the results. And these combinations generate improvements; both related to the issues of mandibular mobility and decreased orofacial pain, as well as to improving the functionality of the orofacial myofunctional system, in general. Studies have also demonstrated that there is no standardization as to the time of therapy, number of sessions or repetitions, or in relation to ways of performing the exercises.

It is concluded that in studies related to Speech Therapy, the treatments bring, in addition to pain reduction, the need for rehabilitation of orofacial functions, a differential aspect concerning other treatments and areas. It should be noted that studies are still scarce within this pathology, and it is of utmost importance to carry out new research on TMJ dysfunction, since Speech Therapy can bring a beneficial variation of treatments, aiming at the restoration of stomatognathic functions.

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